

⑫ 公開特許公報(A) 平4-123534

⑬ Int. Cl.³

H 04 B 7/26

識別記号

1 0 9 Z

庁内整理番号

8523-5K

⑭ 公開 平成4年(1992)4月23日

審査請求 未請求 請求項の数 1 (全6頁)

⑮ 発明の名称 移動機

⑯ 特 願 平2-244576

⑰ 出 願 平2(1990)9月14日

⑱ 発 明 者 村 田 嘉 利 東京都千代田区内幸町1丁目1番6号 日本電信電話株式会社内

⑲ 出 願 人 日本電信電話株式会社 東京都千代田区内幸町1丁目1番6号

⑳ 代 理 人 弁理士 伊東 忠彦

BEST AVAILABLE COPY

PTO 2001-3333

S.T.I.C. Translations Branch

明 細 書

1. 発明の名称

移動機

2. 特許請求の範囲

無線周波数帯と無線回線接続制御プロトコルが異なる複数の無線伝送方式を有し、移動機を一元的に管理する統合移動体通信システムにおいて、

前記複数の無線伝送方式のうちの1つの無線伝送方式に対して、無線回線を設け、外部からのアクティブ信号によって発信および着信を受付可能な状態に移行する機能と外部からのアイドル信号によって発信および着信の動作を停止する機能を有する第1の移動機部と、

前記第1の移動機部とは異なった無線伝送方式の無線回線を確保し、前記第1の移動機部と同一の機能を有する1つまたは複数の第2の移動機部と、

マニュアル操作あるいは無線回線品質に基づい

て複数の該第1及び該第2の移動機部のうち一方の移動機部にアクティブ信号を送出すると共に、もう一方の移動機部にアイドル信号を送出し、該第1及び該第2の移動機部と電話機との間で該第1と該第2の移動機部を制御するコントローラとを有し構成することを特徴とする移動機。

3. 発明の詳細な説明

〔産業上の利用分野〕

本発明は移動機に係り、特に複数の異なった無線伝送方式および無線回線接続制御プロトコルを有する統合移動体通信システムに対応可能な移動機に関する。

〔従来の技術〕

第6図は従来の移動機の構成を示し、無線周波数帯および変復調方式が同一であり、無線回線接続制御プロトコルが異なる2つのシステムに対して無線回線接続可能な移動機について説明する。

無線送受信部60は無線伝送方式、無線回線接続制御プロトコルの両方式に対応可能である。

制御部62も両方式に対応可能であり、コンパチビリティを確保する無線伝送方式のシステム対応の制御プログラムモジュール64と無線回線接続制御プロトコルのシステム対応の制御プログラムモジュール66、および両モジュールを管理する共通モジュール68から構成される。

電話機74は制御部62に接続されている。ベースバンド部分70はレベル調整および、電話機74との間のプロトコル変換を行う。システム登録スイッチ72は移行先のシステムの切り換えを行うスイッチである。

次に従来の移動機の動作を説明する。移動体通信システムは通常、使用に先立ち移動機が基地局側設備に対してシステム登録を行う必要がある。従って、ユーザは現在登録中のシステムのサービスエリアから他のシステムのサービスエリアに移行した場合、システム登録スイッチを移行先システム側にオンする。システム登録スイッチの動き

を検出した制御部62の共通モジュール68は制御プログラムモジュール66にスイッチが切り換えられたことによるシステムの切り換えを指示し、切り換え先システムのプロトコルを用いて移行先システムに登録する。

〔発明が解決しようとする課題〕

しかるに、従来の移動機は無線周波数帯と無線回線接続制御プロトコルが同一である無線伝送方式のシステムに対してのみ有効であり、異なる複数の無線伝送方式では使用できなかった。

本発明は上記の点に鑑みなされたもので無線周波数帯と無線回線接続制御プロトコルが異なる無線伝送方式を有する統合移動体通信システムに対して無線回線接続可能な移動機を提供することを目的とする。

〔課題を解決するための手段〕

第1図は本発明の原理構成を示す。無線周波数帯と無線回線接続制御プロトコルが異なる複数の

無線伝送方式を有し、移動機を一元的に管理する統合移動体通信システムにおいて、複数の無線伝送方式の内の1つの無線伝送方式に対して、無線回線を設け、外部からのアクティブ信号によって発信および着信を受付可能な状態に移行する機能と外部からのアイドル信号によって発信および着信の動作を停止する機能を有する第1の移動機部10と、前記第1の移動機部10とは異なった無線伝送方式の無線回線を確率し、前記第1の移動機部10と同一の機能を有する1つまたは複数の第2の移動機部12と、マニュアル操作あるいは無線回線品質情報に基づいて該第1および該第2の移動機部のうち一方の移動機部にアクティブ信号を送出すると共に、もう一方の移動機部にアイドル信号を送出し、該第1及び該第2の移動機部と電話機16との間で該第1及び該第2の移動機部を制御するコントローラ14とを有する。

〔作用〕

本発明は各無線伝送方式に対応する第1の移動

機部10および第2の移動機部12と電話機16との間にそれらの移動機部を管理するコントローラ14を設け、コントローラ14より第1の移動機部10および第2の移動機部12のうち一方の移動機部にアクティブ信号を送出し、同時に他の移動機部に対してアイドル信号を送出し、接続先の無線伝送方式を切り換えることにより、あらゆる周波数帯や、変復調方式等が異なっている無線伝送方式の移動体通信システム間での登録、接続を行う。

〔実施例〕

第2図は本発明の移動機の適用先である統合移動体通信システムの構成例を示す。同図は移動機を適用する地上系移動体通信方式と衛星系移動体通信方式を交換局レベルで統合し、移動機を一元的に管理するようにした統合移動体通信システムの構成を説明する。統合移動体通信システムは公衆通信網22、共通線信号網24、地上系移動体通信方式の交換局T-MSC20、地上系移動体

通信方式の無線基地局 T-MBS 28、地上系移動体通信方式の無線送受信装置 T-TRx 30、衛星系移動体通信方式の交換局 S-MSC 32、衛星系移動体通信方式の無線基地局 S-MBS 34、衛星系移動体通信方式の無線送受信装置 S-TRx 36、衛星 38、移動機 40 等より構成される。移動機 40 の在圏エリアを含む移動機 40 の各種情報はホームとなる交換局（ホームメモリ局）に管理されており、他の交換局をホームとする移動機 40 がシステム登録してきた場合には、共通線信号網 24 を介してその移動機 40 のホームメモリ局との間で移動機 40 の情報を授受し、ホームメモリ局で移動機 40 を管理する。

第 3 図は本発明の第 1 実施例を説明する図を示す。同図は地上系移動体通信方式と衛星系移動体通信方式の両方式に対して、無線回線接続可能な移動機の構成を示している。この移動機の移動機部は地上系移動機部 42 と衛星系移動機部 60 の 2 つの移動機部を設けている。先ず、地上系移動機部 42 は送信部 44 と受信部 46、移動機部

42 の無線回線の接続制御および電話機 78 からの制御信号の受信制御等を行う制御部 48、移動機部 42 のトラヒック回線のレベル調整および制御回線のプロトコル変換を行うインタフェース部 50、移動機部 42 対応の無線回線の受信レベルを測定するレベル測定部 52、移動機部 42 の音声信号のディジタル化およびその復号を行うコーデック 54、送受分波器 56、アンテナ 58 等で構成されている。

次に衛星系移動機部 60 は先に説明した地上系移動機部 42 の構成と同様であり、送信部 62 と受信部 64、移動機部 60 の無線回線の接続制御および電話機 78 からの制御信号の受信制御等を行う制御部 66、移動機部 60 のトラヒック回線のレベル調整および制御回線のプロトコル変換を行うインタフェース部 68、移動機部 60 対応の無線回線の受信レベルを測定するレベル測定部 70、移動機部 60 の音声信号のディジタル化およびその復号を行うコーデック 72、送受分波器 74、アンテナ 76 等で構成されている。

また、コントローラ 80 は地上系移動体通信方式対応の移動機部 42、衛星系移動体通信方式対応の移動機部 60 と電話機 78 との間において地上系移動体通信方式対応の移動機部 42、衛星系移動体通信方式対応の移動機部 60 をコントロールすると共にトラヒック回線（通話回線）の切り換えを行う。このコントローラ 80 は制御部 82 とスイッチ部 84 から構成される。

地上系移動体通信方式対応の移動機部 42、衛星系移動体通信方式対応の移動機部 60 と電話機 78 とコントローラ 80 を結ぶインタフェースは第 3 図中に実線で示す通話回線の上り回線、通話回線の下り回線と同図中に点線で示すデータ回線の上り回線、データ回線の下り回線、および電話機 78 等で構成する。

上記の移動機を地上系移動体通信方式対応にするためには、コントローラ 80 が地上系移動機部 42 に上記インタフェースを介してアクティブ信号を送出すると共に、衛星系移動機部 60 に対してアイドル信号を送出する。また、地上系移動機

部 42 の通話回線と電話機 78 の通話回線が接続されるようにコントローラ 80 のスイッチ 84 で通話回線のスイッチをセットする。

アクティブ信号を受信した地上系移動機部 42 は位置登録信号を地上系基地局 86 に送出し、地上系基地局 86 からの位置登録応答信号を受信することによってシステム登録完了を確認することにより、発着信を受付可能な状態に移行する。

このとき、アイドル指令信号を受信した衛星系移動機部 60 は発信及び着信の受付動作を停止し、アイドル状態に移行する。

第 4 図は本発明の第 1 実施例の切り換え動作の制御シーケンスを示す。同図は無線回線品質情報（受信レベル）によって、移動機が地上系移動体通信方式で動作していた後、地上系移動体通信方式での無線回線の状態が劣化し、衛星系移動体通信方式に移動機を切り換える場合の動作を示す制御シーケンスである。

地上系移動機部 42 は定期的に受信部 46 で受信したアンテナからの受信レベル情報を制御部

48、インターフェース部50を経由してコントローラ80に送出する(S10)。

衛星系移動機部60から送出されてくる受信レベル情報の値がレベル測定部72で測定した結果、規定のレベルを下回っているとコントローラ80の制御部82で判断した場合は(S11)、コントローラ80は移動機部60に対して回線品質要求信号を送出する(S12)。

回線品質要求信号を受信した移動機部60は受信部64をオン状態にして受信レベルを測定し、受信レベル情報をコントローラ80に送出する(S13)。

コントローラ80は衛星系移動機部60からの受信レベル情報が所定のレベルを上回っていると判断した場合、地上系移動機部42に対してアイドル信号を送出する(S14)と共に衛星系移動機部60に対してアクティブ信号を送出し(S15)、コントローラ80のスイッチ84を切り換える(S16)ことにより通話回線を地上系移動機部42から衛星系移動機部60に切り換える。

24との切り換えを行う同軸スイッチ116、外部アンテナ接続用のコネクタ120、基本移動機100、あるいは電話機154と接続する接続用コネクタ122、送信部104、受信部106、分波器118、制御部114、レベル測定部112、制御信号制御部108、インタフェース部110で構成されている。

基本移動機100は個別移動機102用の外部アンテナ148、コネクタ120と結合可能なコネクタ152、コネクタ122と結合可能なコネクタ150、電話機154との接続用コネクタ156、送受話器とテンキー138、電話機154を個別移動機102あるいは基本移動機100に接続するコネクタ140、送信部126、受信部128、制御信号制御部130、インタフェース部132、制御部136、レベル測定部134、コントローラ部のスイッチ部142、コントローラ部の制御部144、分波器158で構成されている。

個別移動機102を基本移動機100に取り付

衛星系移動機部60は衛星系基地局88に位置登録信号を送信し(S17)、衛星系基地局88は衛星系移動機部60に対して位置登録応答信号を送信する(S18)。

次に本発明の第2実施例について説明する。本実施例の移動機において、1つの移動機部とコントローラを1つの筐体に収納することによって基本移動器を構成すると共に他の移動機部をそれぞれ1つの筐体に収納して個別移動機を構成し、基本移動機に対して個別移動機を着脱可能な着脱移動機を作成することは実現可能である。本着脱移動機において、基本移動機より取り外した個別移動機に電話機を接続することにより、個別移動機は単体の移動機として動作する。

第5図は本発明の第2実施例の着脱移動機の構成を示す。同図中、個別移動機102は第3図の地上系移動機部42を1つの筐体に収納した個別移動機である。基本移動機100は第3図の衛星系移動機部60とコントローラ80を一体化化したものである。個別移動機102は外部アンテナ1

40、電話機154を電話機154側のコネクタ140と、基本移動機100側のコネクタ156を結合させて基本移動機100に接続することにより、個別移動機102のアンテナ124は基本移動機100の外部アンテナ146に切り換わる。これにより、個別移動機102の第5図中、実線で示す通話回線は基本移動機100内のスイッチ142に接続される。同図中、点線で示すデータ回線は制御部144に接続される。

これにより、統合移動体通信システムを構成する複数の移動体通信方式は無線回線に接続できる。

また、基本移動機100と個別移動機102とを取り外し、各移動機に電話機154を接続すれば夫々が各移動体通信方式専用の移動機となる。

(発明の効果)

上記のように本発明によれば、移動機部と電話機間のインタフェースを統一し、各移動体通信方式対応の移動機部とその管理部であるコントローラを組み合わせることにより、いかなる周波数帯、

変復調方式の移動体通信システムとの間でコンパチビリティを確保することができるため、各移動体通信システムによって別々の移動機を用いなくとも容易に通話できる。

80…コントローラ、82…コントローラ制御部、84…コントローラスイッチ、86…地上系基地局、88…衛星系基地局。

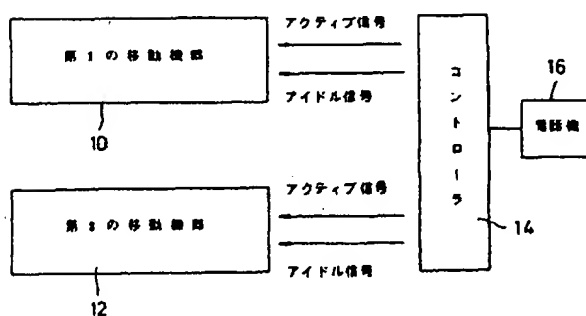
4. 図面の簡単な説明

第1図は本発明の原理構成図、
第2図は本発明の移動機の適用先である統合移動体通信システムの構成例を示す図、
第3図は第1実施例を説明する図、
第4図は第1実施例の切り換え動作の制御シーケンス、
第5図は本発明の第2実施例の着脱移動機の構成図、
第6図は従来の移動機の構成図である。

特許出願人 日本電信電話株式会社

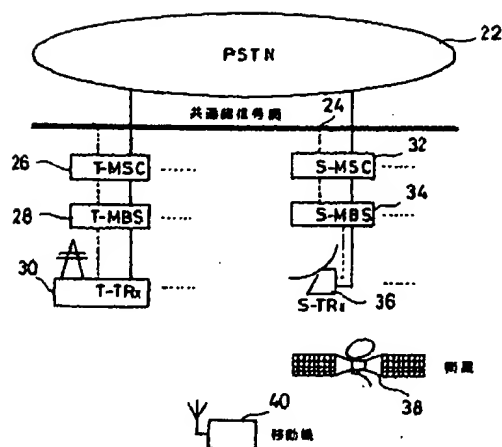
代理人 弁理士 伊東忠彦

10…第1の移動機部、12…第2の移動機部、
14…コントローラ、16…電話機、42…地上系移動機部、60…衛星系移動機部、50、68…インタフェース、52、72…レベル測定部、



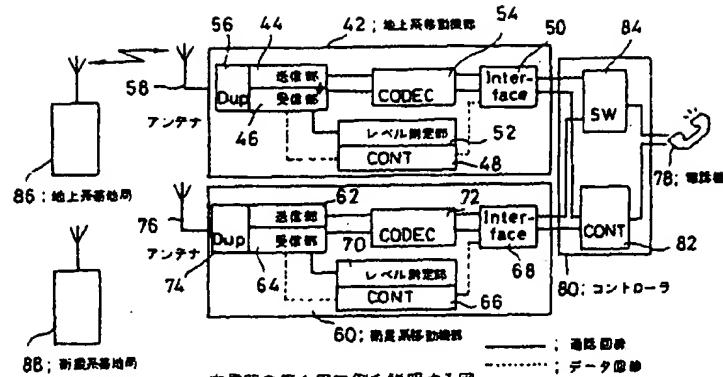
本発明の原理構成図

第1図



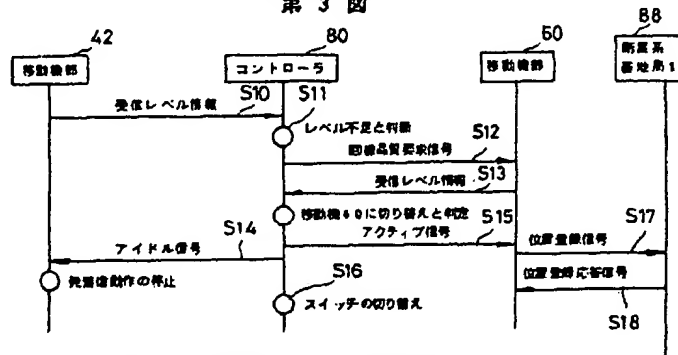
本発明の移動機の適用先である統合移動体通信システムの構成例

第2図



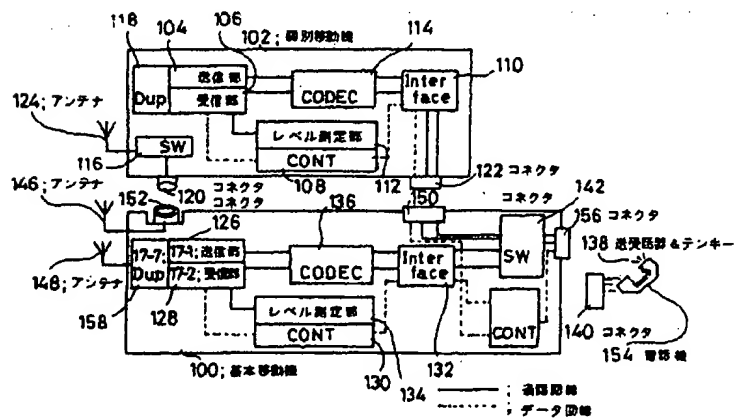
本発明の第1実施例を説明する図

第3図



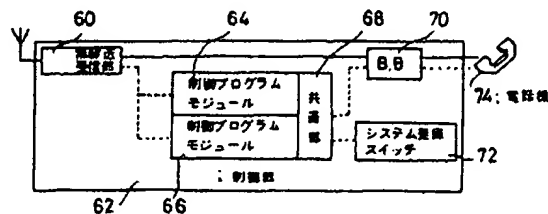
本発明の第1実施例の切り換え動作の制御シーケンス

第4図



本発明の第2実施例の着脱移動機の構成図

第5図



従来の移動機の構成図

第6図

PTO 01-3333

Japanese Kokai Patent Application
No. Hei 4[1992]-123534

MOBILE EQUIPMENT

Yoshitoshi Murata

UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. JULY 2001
TRANSLATED BY THE RALPH MCELROY TRANSLATION COMPANY

JAPANESE PATENT OFFICE
PATENT JOURNAL (A)
KOKAI PATENT APPLICATION NO. HEI 4[1992]-123534

Int. Cl. ⁵ :	H 04 B 7/26
Sequence No. for Office Use:	8523-5K
Filing No.:	Hei 2[1990]-244576
Filing Date:	September 14, 1990
Publication Date:	April 23, 1992
No. of Claims:	1 (Total of 6 pages)
Examination Request:	Not filed

MOBILE EQUIPMENT

[Idoki]

Inventor:	Yoshitoshi Murata
Applicant:	Nippon Telegraph and Telephone Corp.

[There are no amendments to this patent.]

Claim

A type of mobile equipment characterized by the following facts: in an integrated mobile communication system that has plural wireless transmission systems having different wireless frequency bands and wireless line connection control protocols, and that controls the mobile equipment in a unitary manner, the mobile equipment is composed of the following portions:

a first mobile equipment portion that has a wireless line that is set with respect to one wireless transmission system among said plural wireless transmission systems, and that has a function that enables switching to the sending or receiving state upon an active signal from the

* [Numbers in the margin indicate pagination in the foreign text.]

outside, and a function that stops the operation of sending or receiving upon an idle signal from the outside,

one or plural second mobile equipment portions that probability [sic; establish] a wireless transmission system different from that of said first mobile equipment portion, and that has the same functions as those of said first mobile equipment portion,

and a controller that, by means of a manual operation or based on the wireless line quality, sends an active signal to one of said plural first and second mobile equipment portions, and at the same time, sends an idle signal to the other mobile equipment portion, and that controls said first and second mobile equipment portions between said first and second mobile equipment portions and a telephone set.

Detailed explanation of the invention

Industrial application field

The present invention pertains to a type of mobile equipment. In particular, the present invention pertains to a type of mobile equipment that can handle an integrated mobile communication system having plural wireless transmission systems and wireless line connection control protocols different from one another.

Prior art

Figure 6 is a diagram illustrating the constitution of conventional mobile equipment. Let's consider, for example, mobile equipment that allows wireless line connection for two systems having the same wireless frequency band and the same modem system, yet different wireless line connection control protocols.

/2

Wireless transceiver portion (60) can handle the two wireless line connection control protocols in the wireless transmission system.

Control portion (62) also can handle the two systems. It is composed of control program module (64) corresponding to the wireless transmission system that ensures the compatibility, control program module (66) corresponding to the wireless line connection control protocol system, and common module (68) for controlling the two modules.

Telephone set (74) is connected to control portion (62). Baseband portion (70) performs level adjustment and the protocol conversion with telephone set (74). System registration switch (72) is a switch that performs switching of the system as the destination.

In the following, the operation of the conventional mobile equipment will be explained. Usually, for a mobile communication system, before use, the mobile equipment should make a system registration with the equipment in the base station. Consequently, when the user moves from the service area of the system being registered to the service area of another system, the

system registration switch is turned ON to the destination system. As common module (68) of control portion (62) detects this movement of the system registration switch, it sends an instruction to control program module (66) to switch the system by turning the switch, and the protocol of the system as the destination of switching is used to register with the destination system.

Problems to be solved by the invention

However, the conventional mobile equipment is effective only for the wireless transmission system having the same wireless frequency band and wireless line connection control protocol. It cannot be used in plural wireless transmission systems different from one another.

The purpose of the present invention is to solve the aforementioned problems of the conventional methods by providing a type of mobile equipment that allows wireless line connection with respect to an integrated mobile communication system having different wireless frequency bands and wireless line connection control protocols.

Means to solve the problems

Figure 1 is a principle diagram illustrating the constitution of the present invention. The present invention provides a type of mobile equipment characterized by the following facts: in an integrated mobile communication system that has plural wireless transmission systems having different wireless frequency bands and wireless line connection control protocols, and that controls the mobile equipment in a unitary manner, the mobile equipment is composed of the following portions: first mobile equipment portion (10) that has a wireless line that is set with respect to one wireless transmission system among said plural wireless transmission systems, and that has a function that enables switching to the sending or receiving state upon an active signal from the outside, and a function that stops the operation of sending or receiving upon an idle signal from the outside, one or plural second mobile equipment portions (12) that probability a wireless transmission system different from that of said first mobile equipment portion (10), and that has the same functions as those of said first mobile equipment portion (10), and controller (14) that by means of a manual operation or based on the wireless line quality, sends an active signal to one of said plural first and second mobile equipment portions, and at the same time, sends an idle signal to the other mobile equipment portion, and that controls said first and second mobile equipment portions between said first and second mobile equipment portions and telephone set (16).

Functions

The mobile equipment of the present invention has first mobile equipment portion (10) and second mobile equipment portion (12) that correspond to different wireless transmission systems, respectively, and controller (14) that controls the mobile equipment portions with telephone set (16). Controller (14) sends an active signal to one of said first mobile equipment portion (10) and second mobile equipment portion (12), and at the same time, sends an idle signal to the other mobile equipment portion, and switches the wireless transmission system of the destination of connection. In this way, registration and connection can be performed among the wireless transmission type mobile communication systems having any frequency bands and modem systems different from one another.

Application examples

Figure 2 is a diagram illustrating an example of the constitution of the integrated mobile communication system for use of the mobile equipment of the present invention. The integrated mobile communication system is composed of public communication network (22), common line signal network (24), exchange station T-MSC (26) of the ground-system mobile communication system, wireless base station T-MBS (28) of the ground-system mobile communication system, wireless transceiver T-TRx (30) of the ground-system mobile communication system, exchange station S-MSC (32) of the satellite-system mobile communication system, wireless base station S-MBS (34) of the satellite-system mobile communication system, wireless transceiver S-TRx (36) of the satellite-system mobile communication system, satellite-system (38), mobile equipment (40), etc. Various information, including the residual area of mobile equipment (40) is controlled by the exchange station that becomes the home station (home memory station). When mobile equipment (40) that takes another exchange station as the home station makes system registration, the information of mobile equipment (40) is exchanged with the home memory station of mobile equipment (40) through common line signal network (24), and mobile equipment (40) is controlled by the home memory station. /3

Figure 3 is a diagram illustrating Application Example 1 of the present invention. The system shown in this figure has the constitution of mobile equipment that allows wireless line connection with respect to two systems; that is, the ground-system mobile communication system and the satellite-system mobile communication system. Two mobile equipment portions, that is, ground-system mobile equipment portion (42) and satellite-system mobile equipment portion (60), are set for the mobile equipment portions of this mobile equipment. Ground-system mobile equipment portion (42) is composed of sending portion (44) and receiving portion (46), control portion (48) that carries out control on connection of the wireless line of mobile equipment portion (42) and on receiving the control signal from telephone set (78), interface

portion (50) that adjusts the level of the traffic line of mobile equipment portion (42) and converts the control line protocol, level measurement portion (52) that measures the receiving level of the wireless line corresponding to mobile equipment portion (42), CODEC (54) that digitizes the voice signal of mobile equipment portion (42) and its decoding, transceiver branching filter (56), antenna (58), etc.

The satellite-system mobile equipment portion (60) has the same constitution as that of said ground-system mobile equipment portion (42). It is composed of sending portion (62) and receiving portion (64), control portion (66) that carries out control on connection of the wireless line of mobile equipment portion (60) and control on receiving the control signal from telephone set (78), interface portion (68) that adjusts the level of the traffic line of mobile equipment portion (60) and converts the control line protocol, level measurement portion (70) that measures the receiving level of the wireless line corresponding to mobile equipment portion (60), CODEC (72) that digitizes the voice signal of mobile equipment portion (60) and its decoding, transceiver branching filter (74), antenna (76), etc.

Controller (80) controls mobile equipment portion (42) corresponding to the ground-system mobile communication system and mobile equipment portion (60) corresponding to the satellite-system mobile communication system between mobile equipment portion (42) corresponding to the ground-system mobile communication system and mobile equipment portion (60) corresponding to the satellite-system mobile communication system and telephone set (78), at the same time switching the traffic line (conversation line). Said controller (80) is composed of control portion (82) and switching portion (84).

As shown in Figure 3, the interface that connects mobile equipment portion (42) corresponding to the ground-system mobile communication system, mobile equipment portion (60) corresponding to the satellite-system mobile communication system, telephone set (78) and controller (80), is composed of the upstream line of the conversation line and the downstream line of the conversation line indicated by solid lines in the figure, upstream line of the data line and downstream line of the data line indicated by dashed lines in the figure, and telephone set (78), etc.

To be compatible with ground-system mobile communications for the aforementioned mobile equipment, controller (80) sends an active signal through said interface to ground-system mobile equipment portion (42), and at the same time, it sends an idle signal to satellite-system mobile equipment portion (60). Also, the switch of the conversation line is set by switch (84) of controller (80) such that connection is made between the conversation line of ground-system mobile equipment portion (42) and the conversation line of telephone set (78).

Upon receiving the active signal, ground-system mobile equipment portion (42) sends a position registration signal to ground-system base station (86), and it receives the position

registration response signal from ground-system base station (86). As a result, it checks completion of the system registration, and then enters the state that allows sending/receiving.

In this case, satellite-system mobile equipment portion (60) that received the idle instruction signal stops the sending and receiving operation, then enters the idle state.

Figure 4 is a diagram illustrating the control sequence of the switching operation in Application Example 1 of the present invention. This figure illustrates a control sequence of the following operation: the mobile equipment is operated in ground-system mobile communications by means of the wireless line quality information (receiving level); then, as the state of the wireless line in ground-system mobile communications degrades, the mobile equipment is switched to the satellite-system mobile communication system.

Ground-system mobile equipment portion (42) regularly sends receiving-level reception information (from) receiving portion (46) from the antenna through control portion (48) and interface (50) to controller (80) (S10).

/4

When it is judged by control portion (82) of controller (80) that the value of the receiving level information received from satellite-system mobile equipment portion (60) as measured by level measurement portion (72) is lower than a prescribed level (S11), controller (80) sends a line quality request signal to mobile equipment portion (60) (S12).

On receiving the line quality request signal, mobile equipment portion (60), sets on receiving portion (64), measures the receiving level, and sends the receiving level information to controller (80) (S13).

When it is judged that the receiving level information from satellite-system mobile equipment portion (60) is higher than a prescribed level, controller (80) sends an idle signal to ground-system mobile equipment portion (42) (S14), and at the same time, sends an active signal to satellite-system mobile equipment portion (60) (S15). By switching of switch (84) of controller (80) (S16), the conversation line is switched from ground-system mobile [equipment] portion (42) to satellite-system mobile equipment portion (60).

Satellite-system mobile equipment portion (60) sends a position registration signal to satellite-system base station (88) (S17), and satellite-system base station (88) sends a position registration response signal to satellite-system mobile equipment portion (60) (S18).

In the following, Application Example 2 of the present invention will be explained. For the mobile equipment in this application example, a mobile equipment portion and a controller are accommodated in a single basket to form basic mobile equipment, and at the same time, other mobile equipment portions are each accommodated in a basket to form individual mobile equipment. The individual mobile equipment can be set on the basic mobile equipment in a quick-connect/disconnect manner. As a result, quick-connect/disconnect mobile equipment is formed. In this quick-connect/disconnect mobile equipment, by connecting the telephone set to

the individual mobile equipment removed from the basic mobile equipment, the individual mobile equipment can work as single-body mobile equipment.

Figure 5 is a diagram illustrating the constitution of the quick-connect/disconnect mobile equipment in Application Example 2 of the present invention. In this figure, the individual mobile equipment (102) is individual mobile equipment with ground-system mobile equipment portion (42) shown in Figure 3 accommodated in a single basket. Basic mobile equipment (100) is prepared by integrating satellite-system mobile equipment portion (60) shown in Figure 3 and controller (80). Individual mobile equipment (102) is composed of coaxial switch (116) that performs switching with external antenna (124), connector (120) for connecting to the external antenna, basic mobile equipment (100), connector (122) for connecting to telephone set (154), sender (104), receiver (106), branching filter (118), control portion (114), level measurement portion (112), control signal control portion (108), and interface portion (110).

Basic mobile equipment (100) is composed of external antenna (146) for individual mobile equipment (102), connector (152) that can be connected to connector (120), connector (150) that can be connected to connector (122), connector (156) for connecting with telephone set (154), handset and ten-key (138), connector (140) for connecting telephone set (154) to individual mobile equipment (102) or basic mobile equipment (100), sending portion (126), receiving portion (128), control signal control portion (130), interface portion (132), control portion (136), level measurement portion (134), controller's switch portion (142), controller's control portion (144), and branching filter (158).

Individual mobile equipment (102) is mounted on basic mobile equipment (100), and telephone set (154) is connected to connector (140) on the side of telephone set (154) and connector (156) on the side of basic mobile equipment (100), so that it is connected to basic mobile equipment (100). As a result, antenna (124) of individual mobile equipment (102) is switched to external antenna (146) of basic mobile equipment (100). In this way, as shown in Figure 5, individual mobile equipment (102) has the conversation line indicated by the solid line connected to switch (142) inside basic mobile equipment (100). In this figure, the data line indicated by the dashed line is connected to control portion (144).

The plural mobile communication systems that form the integrated mobile communication system can thus be connected to the wireless line.

Also, when basic mobile equipment (100) and individual mobile equipment (102) are separated, and telephone set (154) is connected to each piece of mobile equipment, it is possible to form pieces of mobile equipment respectively dedicated to various mobile communication systems.

Effects of the invention

As explained above, according to the present invention, by unifying the interface between mobile equipment and the telephone set, and by combining the mobile equipment portions corresponding to the various mobile communication systems and the controller as the control portion, it is possible to ensure compatibility with any mobile communication system in any frequency band and of any modem system. Consequently, it is possible to converse using different mobile equipment corresponding to different mobile communication systems.

/5

Brief description of the figures

Figure 1 is a principle diagram illustrating the constitution of the present invention.

Figure 2 is a diagram illustrating an example of the constitution of the integrated mobile communication system that adopts the mobile equipment of the present invention.

Figure 3 is a diagram illustrating Application Example 1.

Figure 4 is a diagram illustrating the control sequence of the switching operation in Application Example 1 of the present invention.

Figure 5 is a diagram illustrating the constitution of the quick-connect/disconnect mechanism of Application Example 2.

Figure 6 is a diagram illustrating the constitution of conventional mobile equipment.

10	First mobile equipment portion
12	Second mobile equipment portion
14	Controller
16	Telephone set
42	Ground-system mobile equipment portion
60	Satellite-system mobile equipment portion
50, 68	Interface
52, 72	Level measurement portion
80	Controller
82	Controller's control portion
84	Controller switch
86	Ground-system base station
88	Satellite-system base station

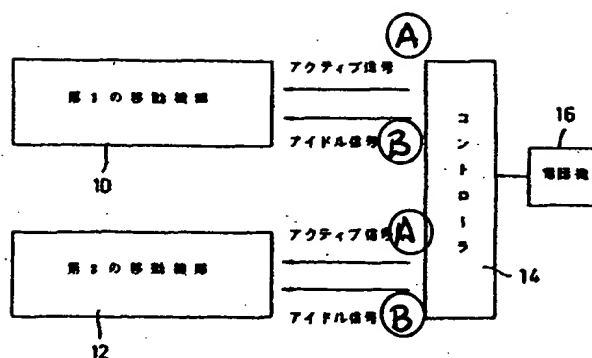


Figure 1. Principle diagram illustrating the constitution of the present invention

- Key: A Active signal
 B Idle signal
 10 First mobile equipment portion
 12 Second mobile equipment portion
 14 Controller
 16 Telephone set

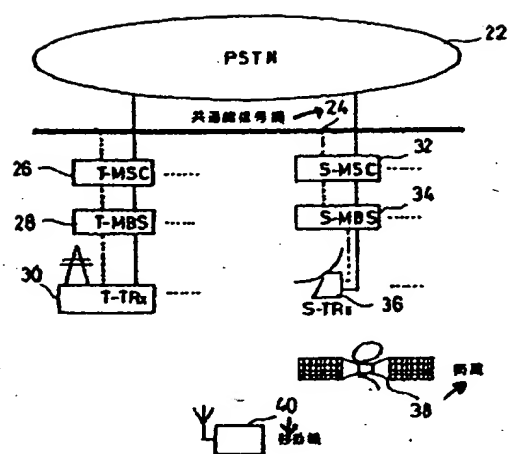


Figure 2. Diagram illustrating an example of the constitution of the integrated mobile communication system that adopts the mobile equipment of the present invention.

Key: 24 Common line signal network
 38 Satellite-system
 40 Mobile equipment

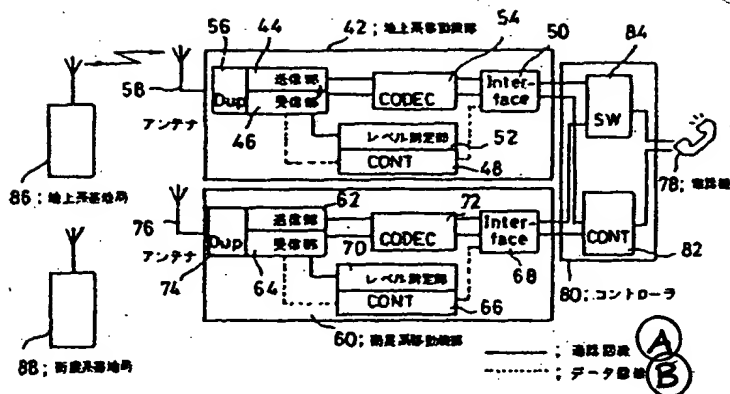


Figure 3. Diagram illustrating Application Example 1

- Key:
- A Conversation line
 - B Data line
 - 42 Ground-system mobile equipment
 - 44 Sending portion
 - 46 Receiving portion
 - 52 Level measurement portion
 - 58 Antenna
 - 60 Satellite-system mobile equipment
 - 62 Sending portion
 - 64 Receiving portion
 - 70 Level measurement portion
 - 76 Antenna
 - 78 Telephone set
 - 80 Controller
 - 86 Ground-system base station
 - 88 Satellite-system base station

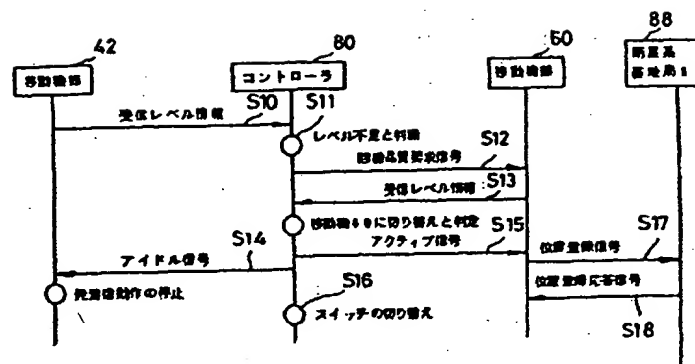


Figure 4. Diagram illustrating the control sequence of the switching operation in Application Example 1 of the present invention.

- Key:
- 42 Mobile equipment portion
 - 60 Mobile equipment portion
 - 80 Controller
 - 88 Satellite-system base station
 - S10 Receiving level information
 - S11 Judgment of insufficient level
 - S12 Line quality request signal
 - S13 Receiving level information
 - S14 Idle signal, stop sending/receiving operation
 - S15 Judgment to switch to mobile equipment (40), active signal
 - S16 Switching of switch
 - S17 Position registration signal
 - S18 Position registration response signal

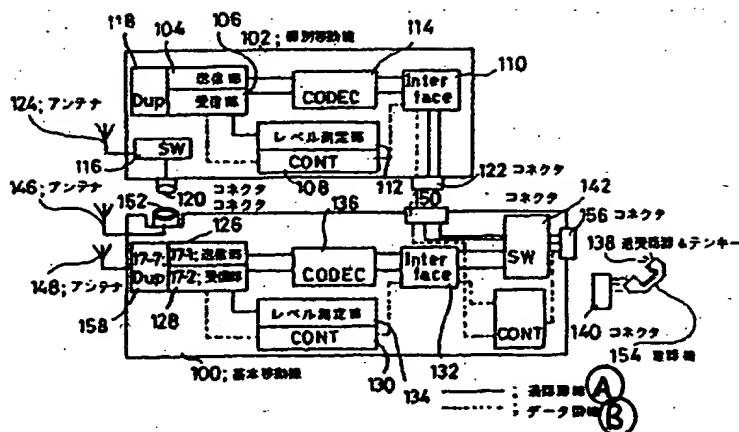


Figure 5. Diagram illustrating the constitution of the quick-connect/disconnect mechanism of Application Example 2.

Key: A	Conversation line
B	Data line
100	Basic mobile equipment
102	Individual mobile equipment
104	Sending portion
106	Receiving portion
112	Level measurement portion
120	Connector
122	Connector
126	17-1: Sending portion
128	17-2: Receiving portion
134	Level measurement portion
138	Handset & ten-key
124, 146, 148	Antenna
154	Telephone set
156	Connector

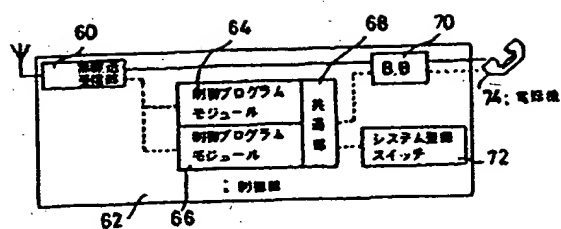


Figure 6. Diagram illustrating the constitution of the conventional mobile equipment

- Key:
- 60 Wireless transceiver portion
 - 62 Control portion
 - 64 Control program module
 - 66 Control program module
 - 68 Common portion
 - 72 System registration switch
 - 74 Telephone set

**This Page is Inserted by IFW Indexing and Scanning
Operations and is not part of the Official Record**

BEST AVAILABLE IMAGES

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images include but are not limited to the items checked:

- ☒ BLACK BORDERS
- ☒ IMAGE CUT OFF AT TOP, BOTTOM OR SIDES
- ☐ FADED TEXT OR DRAWING
- ☐ BLURRED OR ILLEGIBLE TEXT OR DRAWING
- ☐ SKEWED/SLANTED IMAGES
- ☒ COLOR OR BLACK AND WHITE PHOTOGRAPHS
- ☐ GRAY SCALE DOCUMENTS
- ☐ LINES OR MARKS ON ORIGINAL DOCUMENT
- ☒ REFERENCE(S) OR EXHIBIT(S) SUBMITTED ARE POOR QUALITY
- ☐ OTHER: _____

IMAGES ARE BEST AVAILABLE COPY.

As rescanning these documents will not correct the image problems checked, please do not report these problems to the IFW Image Problem Mailbox.